# 673

# HALF-WAVE MERCURY-VAPOR RECTIFIER

## GENERAL DATA

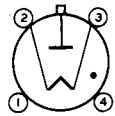
**Electrical:**

| | | |
|---|---|---|
| Filament, Coated: | | |
| Voltage | 5 ± 5% | ac volts |
| Current at 5 volts | 10 | amp |
| Minimum heating time at rated voltage | 30 | sec |
| Peak Tube Voltage Drop (Approx.) | 10 | volts |

**Mechanical:**

| | |
|---|---|
| Operating Position | Vertical, base down |
| Maximum Overall Length | 11-7/16" ← |
| Seated Length | 9-9/16" + 1-1/16" − 1/4" ← |
| Maximum Diameter | 3-1/8" ← |
| Weight (Approx.) | 10.8 oz ← |
| Cap | Medium (JETEC No.C1-5) |
| Base | Large-Metal-Shell Super-Jumbo 4-Pin with Bayonet (JETEC No.A4-18) |
| Basing Designation for BOTTOM VIEW | 2P |

Pin 1 – No Connection
Pin 2 – Filament, Cathode Shield




Pin 3 – Filament
Pin 4 – No Connection
Cap – Anode

Temperature Control:

*Heating*--When the ambient temperature is so low that the normal rise of condensed-mercury temperature above the ambient temperature will not bring the condensed-mercury temperature up to the minimum value of the operating ranges specified under ***Maximum Ratings***, some form of heat-conserving enclosure or auxiliary heater will be required.

*Cooling*--When the operating conditions are such that the maximum value of the operating condensed-mercury-temperature range is exceeded, provision should be made for forced-air cooling sufficient to prevent exceeding the maximum value.

| | | |
|---|---|---|
| Temperature Rise of Condensed Mercury to Equilibrium Above Ambient Temperature (Approx.): | | |
| No load* | 12 | °C |
| Full load▲ | 17.5 | °C |

* With 4.75 volts rms on filament, and no heat-conserving enclosure.

▲ With 5.25 volts rms on filament, quadrature operation, average anode current = 2.5 amperes, and no heat-conserving enclosure.

← Indicates a change.

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# HALF-WAVE MERCURY-VAPOR RECTIFIER

## HALF-WAVE RECTIFIER — In-Phase Operation•

**Maximum Ratings,** *Absolute Values: For supply frequency of 60 cps*

| | Operating Condensed-Mercury-Temperature Range | | |
|---|---|---|---|
| | 20° to 60° C | 20° to 50° C | |
| PEAK INVERSE ANODE VOLTAGE. . . . . | 10000 max. | 15000 max. | volts |
| ANODE CURRENT: | | | |
| Peak . . . . . | 7 max. | 6 max. | amp |
| Average**. . . . . | 1.75 max. | 1.5 max. | amp |
| Fault, for duration of 0.1 second maximum . . . | 100 max. | 100 max. | amp |

## HALF-WAVE RECTIFIER — Quadrature Operation••

**Maximum Ratings,** *Absolute Values: For supply frequency of 60 cps*

| | Operating Condensed-Mercury-Temperature Range | | |
|---|---|---|---|
| | 20° to 60° C | 20° to 50° C | |
| PEAK INVERSE ANODE VOLTAGE. . . . . | 10000 max. | 15000 max. | volts |
| ANODE CURRENT: | | | |
| Peak . . . . . | 10 max. | 10 max. | amp |
| Average**. . . . . | 2.5 max. | 2.5 max. | amp |
| Fault, for duration of 0.1 second maximum . . . | 100 max. | 100 max. | amp |

## CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

| | Note | Min. | Max. | |
|---|---|---|---|---|
| Filament Current . . . . | 1 | – | 11.5 | amp |
| Critical Anode Voltage . | 2 | – | 100 | volts |
| Peak Tube Voltage Drop . | 3 | – | 16 | volts |

Note 1: With 5 volts rms on filament.

Note 2: With 4.75 volts rms on filament, and condensed-mercury temperature at 20° C.

Note 3: With 5 volts rms on filament, condensed-mercury temperature of 35° ± 5° C, peak anode current of 20 amperes provided by half-cycle pulse from a 60-cps sine wave and recurring approximately once a second. Tube drop is measured by an oscilloscope connected between anode and center-tap of filament transformer.

• Filament voltage in phase with anode voltage.

** Averaged over any interval of 20 seconds maximum.

•• Filament voltage out of phase (60° to 120°) with anode voltage.



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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# HALF-WAVE MERCURY-VAPOR RECTIFIER

For Circuit Figures, see Front of this Section

| CIRCUIT | MAX. TRANS. SEC. VOLTS (RMS) E | APPROX. DC OUTPUT VOLTS TO FILTER $E_{av}$ | MAX. DC OUTPUT AMPERES $I_{av}$ | MAX. DC OUTPUT KW TO FILTER $P_{dc}$ |
|---|---|---|---|---|
| **Fig. 1** **Half-Wave** **Single-Phase** In-Phase Operation | 10600□ | 4800 | 1.50 | 7.1 |
| | 7000▲ | 3200 | 1.75 | 5.5 |
| **Fig. 2** **Full-Wave** **Single-Phase** In-Phase Operation | 5300□ | 4800 | 3.00 | 14.2 |
| | 3500▲ | 3200 | 3.50 | 11.0 |
| **Fig. 3** **Series** **Single-Phase** In-Phase Operation | 10600□ | 9600 | 3.00 | 28.4 |
| | 7000▲ | 6400 | 3.50 | 22.0 |
| **Fig. 4** **Half-Wave** **Three-Phase** In-Phase Operation | 6100□ | 7200 | 4.50 | 32.2 |
| | 4000▲ | 4800 | 5.25 | 25.0 |
| **Fig. 5** **Parallel** **Three-Phase** Quadrature Operation | 6100□ | 7200 | 15.0 | 108 |
| | 4000▲ | 4800 | 15.0 | 72 |
| **Fig. 6** **Series** **Three-Phase** Quadrature Operation | 6100□ | 4300 | 7.5 | 108 |
| | 4000▲ | 9600 | 7.5 | 72 |
| | | | *Resistive Load* / *Inductive Load* | *Resistive Load* / *Inductive Load* |
| **Fig. 7** **Half-Wave** **Four-Phase** Quadrature Operation | 5300□ | 6750 | 9.0 / 10.0 | 60.8 / 67.5 |
| | 3500▲ | 4500 | 9.0 / 10.0 | 40.5 / 45.0 |
| | | | *Resistive Load* / *Inductive Load* | *Resistive Load* / *Inductive Load* |
| **Fig. 8** **Half-Wave** **Six-Phase** Quadrature Operation | 5300□ | 7200 | 9.5 / 10.0 | 68.4 / 72.0 |
| | 3500▲ | 4800 | 9.5 / 10.0 | 45.6 / 48.0 |

□ For maximum peak inverse anode voltage of 15,000 volts, and condensed-mercury-temperature range of 20° to 50° C.

▲ For maximum peak inverse anode voltage of 10,000 volts, and condensed-mercury-temperature range of 20° to 60° C.

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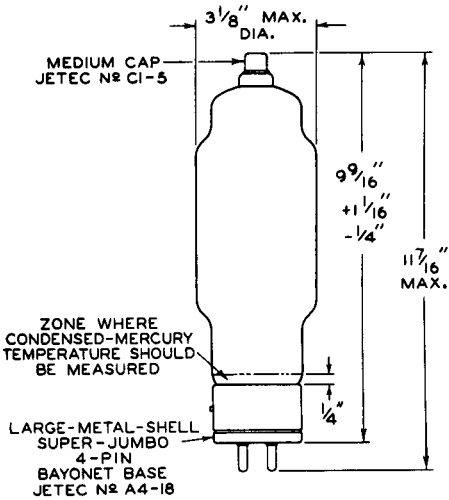
## OPERATING CONSIDERATIONS

*Shields and rf filter circuits* should be provided for the 673 if it is subjected to extraneous high-frequency fields during operation. These fields tend to produce breakdown effects in mercury vapor and are detrimental to tube life and performance. When shields are used, special attention must be given to providing adequate ventilation and to maintaining normal condensed-mercury temperature. Rf filters are employed to prevent damage caused by rf currents which might otherwise be fed back into the rectifier tubes.

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# RATE OF RISE OF COND-MERCURY TEMPERATURE